

**I. IN THE SPECIFICATION**

Please replace the paragraphs at page 4, lines 11 – 17 with the following replacement paragraphs:

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--Figure 1 illustrates the 1993 version of the International Phonetic Alphabet.

Figure 2 illustrates the method associated with the preferred embodiment of the present invention for determining a compact model to transcribe the Arabic language acoustically based on a well-defined basic phonetic study.

Figure 3 illustrates in further detail the data extraction step of Figure 2.

Figure 4 illustrates the composition of the maximal set described in the method of Figure 2.

Figure 5 illustrates the various kinds of phonemes.

Figure 6 illustrates the reduction of maximal set for the text to speech system and the automatic speech recognition sets in a preferred embodiment of the invention.--

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Please replace the paragraph at page 5, line 17 - page 6, line 2 with the following replacement paragraph:

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--It should be noted that the International Phonetic Alphabet (IPA) was used in conjunction with this invention. The IPA, as defined by the International Phonetic Association (<http://www.arts.gla.ac.uk/IPA/ipa.html>) is a standard set of symbols for transcribing the sounds of spoken languages. The above mentioned website provides for a full chart of IPA symbols as reproduced in Figure 1. Furthermore, charts for consonants, vowels, tones and accents, suprasegmentals, diacritics and other symbols are also provided. The last version of the IPA dates to 1993, as shown in Figure 1.--

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Please replace the paragraphs at page 8, line 12 - page 10, line 13 with the following replacement paragraph:

--Figure 2 illustrates the method 100 associated with the preferred embodiment of the present invention for determining a compact model to transcribe the Arabic language acoustically (based on a well-defined basic phonetic study). First, a language for which a compact model is to be developed is identified 102. Next, information regarding the identified language is extracted or collected 104. Data extraction can be accomplished via a variety means including, but not limited to: extracting data regarding the Arabic language via a network (such as the Internet, Local Area Network (LAN), Wide Area Network (WAN) or database (local or remote). Next, from the extracted data, a list is created where the phonological and phonetic units are defined 106. As a next step, the variations in the Arabic language are identified 108. For example, variations in classical Arabic, Modern Standard Arabic (MSA), and colloquial Arabic are identified. Next, a maximal set is created that contains all phonemes, allophones, and transliteration symbols associated with the Arabic language 110. Transliteration refers to the process of representing or spelling a word (in a first language) in the characters of another alphabet (second language). Lastly, the maximal set is reduced 112 to provide for a compact set to transcribe the Arabic language acoustically. The details of the reduction step are explained in detail in the following sections.

The data extraction step of Figure 2 (102) is illustrated in further detail in Figure 3. With the extracted data, terminological problems are identified 202. Certain terms that have been used by several phonological linguists in their attempt to define and describe the nature of various Arabic sounds have proved invalid; i.e. whereas few linguists may include phonemes like /F7/, /R7/, and /X/ into the category of Emphatics, others may include them in the category of

pharyngeals. As a result of this non-final consensus, the most appropriate category depending upon their influence on the neighboring vowels was selected. Next, transcription problems associated with the language in question (e.g., Arabic) are identified 204. In contrast to what the IPA exhibits in using special symbols (ASCII characters) which might cause technical problems if used in the present system; the transcription set was limited to include the characters which can be typed easily on the keyboard. Furthermore, phonological and phonetic units were extracted or collected 206 and a feature set was established based on this information 208. Next, a representative symbol for the transcription alphabet is selected 210 and a structured source is built 212. Our structured source consists of Phonemes, which are divided into three main units: Consonants, Vowels and Semi-Vowels. The unit "Consonants" includes a variety of Allophones and Geminations. Aallophones may have their own gemination variety. The unit "Vowels" has a variety of allophones only, while the unit "Semi-vowel" has just gemination variety. The features of these units are determined according to three conditions: Place, manner of articulation in addition to the nature of the sound being voiced or voiceless.

Figure 4 illustrates the composition of the maximal set described in step 110 of Figure 2. Maximal set 300 comprises (but is not limited to): phonemes 302, allophones 304, a set of rules governing the selection of allophones 306, a set of examples 308, and the transliteration symbols 310. It should be noted that although the preferred language of this application is Arabic, one skilled in the art could extend the present invention to cover other similar languages. A detailed description of the Arabic phonetic study as per the present invention is given below.--

Please replace the paragraphs at page 12, line 10 - page 13, line 2 with the following replacement paragraphs:

--The reduction of maximal set for the TTS and the ASR phonetic sets are described in detail in Figure 6.

**TTS Phonetic Set**

AS In the phonetic set for the TTS system, all the phonemes and allophones with which any given text message can be conveyed is found. For example, i) all the allophones for the vowels are identified; ii) allophones that represent any borrowed word in Arabic are identified, and iii) in the case of gemination, add symbols to represent the phoneme when it is geminated. Thus, geminated phonemes represented by doubling the original symbol, are represented by a new symbol.--

Please replace the paragraphs at page 21, line 1 - page 28, line 9 with the following replacement paragraphs:

--TABLE 1 ***Arabic Phonetic Alphabet Table***

***The Table Supports:***

AS 1) Well Educated Pronunciation (Used in Text To Speech)

2) In the Sound Features Field

- i. (+) = Voiced
- ii. (-) = Voiceless



!LName	A. letter	Sound Features	New Alphabet	Examples	Transcription
Alif	ا	glottal plosive -	C	أدلة	Ce.dIl.le
		epiglottal fricative +	0	مؤذن	mu.0e4.4In
Ba	ب	bilabial plosive +	b	باطلة	b1.8l.le
	بْ	geminated bilabial plosive +	B	تَبَّسَا	te.ne.Be.0e
Ta	ت	alveolar plosive -	t	تَحْلِيل	teh.l3l
	تْ	geminated alveolar plosive -	T	سَيِّئَةٌ	sl.Te
Tha	ث	dental fricative -	F	ثَمَانِيَّة	Fe.mE.ni.je
	ثْ	gemi'nated dental fricative -	FF	مُكَافَف	mu.keF.Fef
Jim	ج	velar plosive +	g	جَلَسَ	gel.se
		alveolo-palatal fricative +	5		5el.se
	جْ	Geminated velar plosive +	G	مُتَعَجِّل	mu.te.Ve.Gll
Ha			55		mu.te.Ve5.5ll
	ح	Pharyngeal fricative -	h	خَضِرْ	ha.6A.rA
Kha	خ	Geminated pharyngeal fricative -	hh	صِيْحَةٌ	Slh.ha
		uvular fricative -	x	خَفَسَ	xem.se
Dal	خْ	geminated uvular fricative -	xx	السَّخَّان	Ces.sex.xEn
	د	alveolar plosive +	d	دَعَمَ	DeVm
	دْ	geminated alveolar plosive +	D	مَدَّ	me.De

Dal	ذ	dental fricative +	4	اذان	CE.4En
	ذ	geminated dental fricative +	44	الذاتي	Ce4.4E.tlJ
Ra	ر	r flap not retroflexed +	r	رمسيس	ram.s3s
	ر	alveolar trill +	R	أقر	Ce.qA.RA
Za	ز	alveolar fricative +	z	زيت	Zejt
	ز	geminated alveolar fricative +	zz	خرن	xez.ze.na
Sin	س	alveolar fricative -	s	سبيل	se.b3l
	س	geminated alveolar fricative -	ss	السبت	Ces.sebt
Shin	ش	post alveolar fricative -	c	شركة	ce.ri.ke
	ش	geminated post alveolar fricative -	cc	الشوفا	Cec.ce.WEf
Sad	ص	pharyngealised s -	S	صلى	SAI.I3
	ص	geminated pharyngealised s -	SS	الصياد	CAS.SA.J1d
Dad	ض	pharyngealised d +	6	حضر	hA.6A.rA
	ض	geminated pharyngealised d +	7	فضة	fl.7A
Ta	ط	pharyngealised t -	8	طلع	8A.la.Ve
	ط	geminated pharyngealised t -	9	الطارئة	Cel.bA.92.rl.Je
Za	ظ	pharyngealised dal +	Z	ظل	ZAl.la
	ظ	geminated pharyngealised dal +	ZZ	الظام	CAZ.ZA.l1m

Ain	ع	pharyngeal fricative +	V	عرض	VAR6
	ع	geminated pharyngeal fricative +	VV	أَيْشَعَة	Ce.ciV.Ve
Ghain	غ	uvular fricative +	P	الصنْبَاغَة	CeS.Si.b1.Pa
	غ	geminated uvular fricative +	PP	ثَوْعَل	te.weP.Pol
Fa	ف	labiodental fricative -	f	الحقل	Cel.hefl
		labiodental fricative +	v	تَلِفِيزُون	tl.li.vls.jOn
	ف	geminated labiodental fricative -	ff	إِسْتَحْفَاف	Cls.te.xef.fe
qaf	ق	uvular plosive -	q	قصر	QASr
	ق	geminated uvular plosive -	Q	حقة	ha.QA.Hu
kaf	ك	velar plosive -	k	كَلْبَة	kul.li.Je
	ك	geminated velar plosive -	K	تَمَكَّنَت	te.me.Ke.net
lam	ل	alveolar lateral approximant +	l	لَبْلَبِي	ju.le.B3
	ل	geminated alveolar lateral approximant +	LL	الله	CAL.L2X
		geminated pharyngealised +	ll	المُسْلَحَة	Cel.mu.sel.le.ha
mim	م	bilabial nasal +	m	مَسْجِد	mes.5Id
	م	geminated bilabial nasal +	mm	الهَامَة	Cel.Hem.me
nun	ن	alveolar nasal +	n	نعم	ne.Vem
		velar nasal +	N	الكَر	CaN.ka.ra
ha	ن	geminated alveolar nasal +	nn	تَصْنَع	ta.San.na.Va
	ه	glottal fricative -	X	فهد	feXd
		glottal fricative +	H	ظهر	ZA.Ha.rA

	هـ	geminated glottal fricative +	HH	ثَوَهْم	ta.weH.He.me
waw	و	labio-velar approximant +	W	دَوَل	du.wel
	و	geminated labio-velar approximant +	W	الْتَلَوْت	Ce.Te.le.WuF
ya	ي	palatal approximant +	j	يَذْعَم	jed.Vom
	ي	geminated palatal approximant +	J	الْتَلَيْن	Ce.Te.de.Jon
fatha		open mid front	e	تَخْرِنَة	te5.rl.be
		open front	a	صَلَق	SA.da.qa
		low back	A	قَطَنِي	qA.62
kasra		mid-high mid-front short	i	الْتَاقِد	Cen.n1.qld
		close front	I	إِلَى	Ci.IE
damma		close back	u	أَمْهَات	Cum.me.HEt
		open – mid back	o	الْعُرْف	Cel.Po.raf
alif		mid front long	E	الشَّابَاب	Cec.ce.bEBb
		open front	1	الْحَاسِب	Cel.hE.slb
		low back	2	إِقْصَال	Cln.fi.S2l
waw		close back	U	ثُدُور	te.dUr
		open mid back	O	دُكُور	duk.tOr
ya		mid-high mid-front long	Y	أَمِير	Cem.bYr
		close front	3	رَيْس	ra.03s



TABLE 2

wegd	وَجَدَ
waqt	وَقْتُ
WA6V	وَضَعَ

(Different symbols that represent short Fatha)

NE.0Im	نَائِم
N1.qId	نَاقِد
N2.6Ig	نَاضِج

(Different symbols that represent long Fatha)

TABLE 3

Ben.nEC	بَاءَ
Ra.B3	رَبِّي
8A.lab	طَلَب
CA.9A.lab	الطَّلَب